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# *LIMNODRILOIDES FAXATUS* AND *DOLIODRILUS PUERTORICENSIS*, NEW LIMNODRILOIDINAE (OLIGOCHAETA: TUBIFICIDAE) FROM PUERTO RICO

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*Abstract.*—*Limnodriloides faxatus,* new species, with long, heavily muscular atrial ducts, dorsal spermathecal pores and torch-shaped sperm bundles in the spermathecal ampullae, and *Doliodrilus puertoricensis,* new species, with atrial ducts that are only moderately modified (by comparison with its congeners) and minute spermathecae, are described from the west coast of Puerto Rico.

A few marine Tubificidae (subfamilies Rhyacodrilinae, Phallodrilinae, and Tubificinae) were recently described from Aguadilla and Mayagüez Bays in Puerto Rico by Milligan (1986) from material collected by Dr. A. Stoner for the Center for Energy and Environmental Research, University of Puerto Rico. A new member of the Limnodriloidinae from the same collection, *Limnodriloides faxatus,* is described in the present paper together with *Doliodrilus puertoricensis,* another new species from the west coast of Puerto Rico. The material of the latter, which was placed at the first author's disposal by Dr. M. L. Jones at the National Museum of Natural History (USNM), Washington, D.C., originates from a benthic community study in Laguna Joyuda (near Mayagüez) conducted by Mr. R. L. Castro at the Department of Marine Sciences, University of Puerto Rico.

The anterior end of one of the specimens of *D. puertoricensis* was sectioned and stained in Heidenhain's hematoxylin and eosin; the remaining material was stained in paracarmine or Grenacher's alcohol borax carmine and mounted whole in Canada balsam. The types series are deposited at the USNM.

## *Limnodriloides faxatus,* new species
Fig. 1

*Holotype.*—USNM 101460, whole-mounted specimen.

*Type locality.*—Mayagüez Bay, 1 mile offshore, 18°15′48″N, 67°12′05″W, 11.5 m, silt and clay with pockets of detritus (coll. A. Stoner, 14 May 1985).

*Paratypes.*—USNM 101461, 2 specimens from Aguadilla Bay, 18°29′03″N, 67°10′44″W, 16 m, mud and shell fragments (coll. A. Stoner, 18 Apr 1985).

*Other material examined* (authors' collection).—Six specimens: 1 from type locality, 4 from locality of paratypes, and 1 from another station in Aguadilla Bay, 38 m, coarse sand and shell (coll. A. Stoner, 18 Apr 1985).

*Description.*—Length (only 1 complete specimen) 7.1 mm, 52 segments. Width at XI (compressed, whole-mounted worms), 0.17–0.26 mm. Clitellum extending over XI–XII in 1 paratype, poorly developed in other specimens. Setae (Fig. 1A) bifid, 35–50 μm long, 1.5–2 μm thick, with upper tooth slightly thinner and shorter than lower. Setae 2–3 per bundle anteriorly, absent from X–XI, 2 per bundle in postclitellar seg-

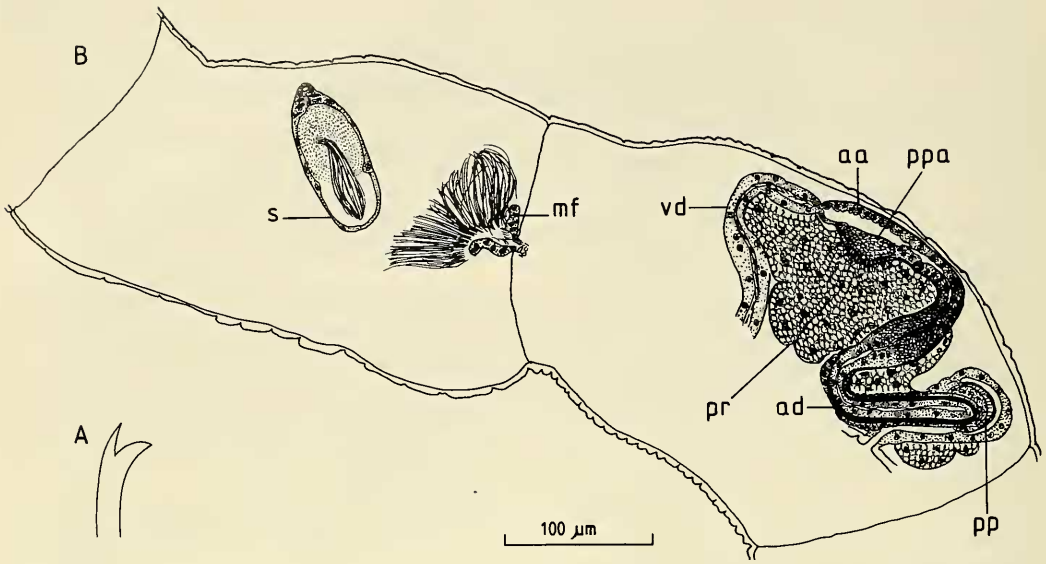


Fig. 1. *Limnodriloides faxatus*: A, Free-hand drawing of seta; B, Lateral view of genitalia in segments X–XI. (aa = atrial ampulla, ad = atrial duct, mf = male funnel, pp = pseudopenial papilla, ppa = prostatic pad, pr = prostate gland, s = spermatheca, vd = vas deferens.)

ments. Male pores paired in line with ventral setae in posterior part of XI. Spermathecal pores in line with dorsal setae in middle of X.

Pharyngeal glands in IV–V. Pair of slender oesophageal diverticula present anteriorly in IX. Male genitalia (Fig. 1B) paired. Vas deferens 16–22 µm wide, probably somewhat longer than atrium (not observed in its full length in available material), entering atrium apically. Atrial ampulla 40–75 µm long, 28–50 µm wide, ventrally bearing conspicuous prostatic pad; latter causing wall of ampulla to bulge considerably. Prostate gland large and lobed. Atrial duct slender (about 280 µm long in holotype), entally narrow and without granulation, in middle part with granulated inner epithelium and thin outer lining, ectally without granulation but with up to 10 µm thick muscular lining. Atrial duct terminating in large papilla at inner end of voluminous copulatory sac. Spermathecae (Fig. 1B, s) oblong, 100–145 µm long, 35–55 µm wide, with short (sometimes indistinct) ducts and thin-walled ampullae. In postcopulatory individuals, each ampulla with 1–2 torch-shaped, very characteristic bundles of sperm, latter partly embedded in amorphous mass of secretion.

*Remarks.*—The dorsal spermathecae, the long atrial ducts, and the absence of spermathecal setae render *L. faxatus* a member of the *agnes*-group within *Limnodriloides* (cf. Erséus 1982). The new species is easily distinguished from the other forms within this group by its wide and heavily muscular atrial ducts (ducts narrow and with thin muscular lining in the other species), and the characteristic shape of the sperm bundles in the spermathecae.

*Etymology.*—The name *faxatus* means 'with torch,' or 'flame,' and refers to the appearance of the sperm bundles in the spermathecae.

*Distribution and habitat.*—Known only from the west coast of Puerto Rico. Subtidal, muddy or shelly sediments, 11.5–38 m depth.

*Doliodrilus puertoricensis,* new species
Fig. 2

*Holotype.*—USNM 101462, whole-mounted specimen.

*Type locality.*—Laguna Joyuda, an en-

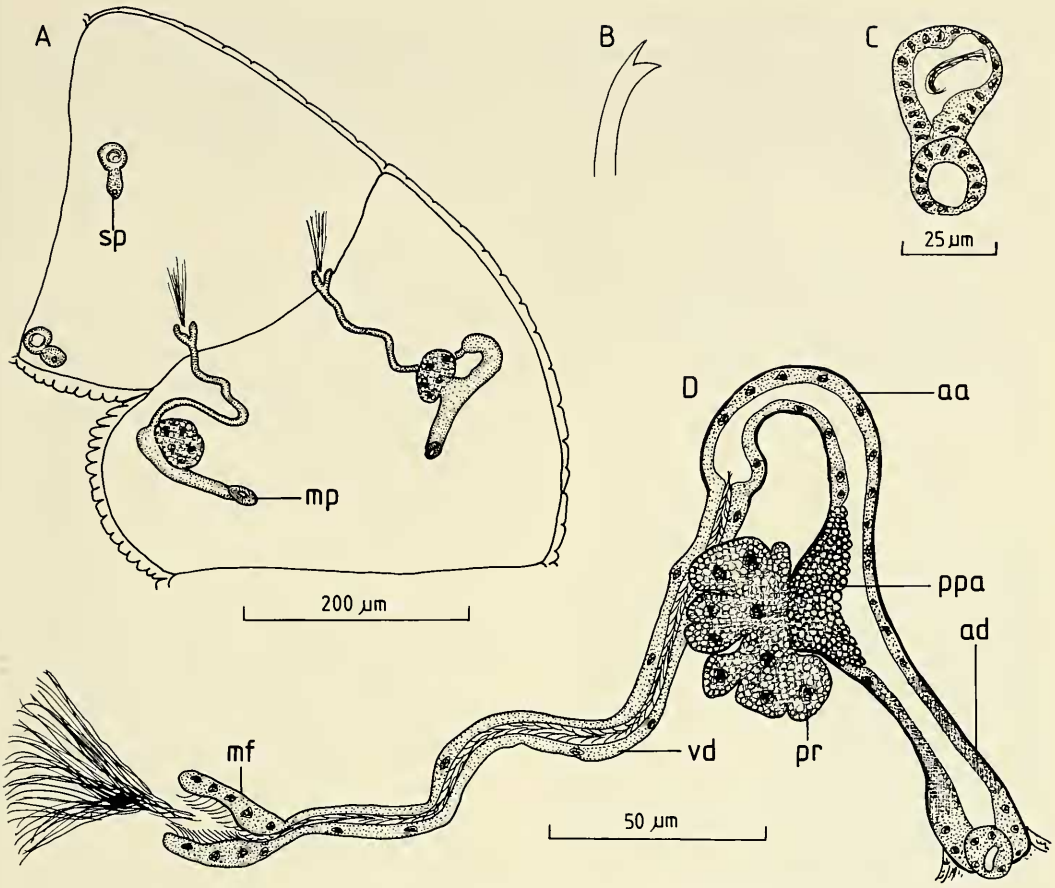


Fig. 2. *Doliodrilus puertoricensis*: A, Ventral view of segments X–XI, showing size and location of spermathecae and male ducts; B, Free-hand drawing of seta; C, Spermatheca; D, Male efferent duct. (mp = male pore, sp = spermathecal pore; other abbreviations as in Fig. 1.)

closed brackish-water lagoon (salinities fluctuating between 8 and 44‰) located 9 km S of Mayagüez, W Puerto Rico, 1–2.5 m, mud (material coll. R. L. Castro on several occasions between 9 Nov 1978 and 10 Jul 1979, holotype on 10 Jan 1979).

*Paratypes.*—USNM 101463–101468, 1 sectioned and 5 whole-mounted specimens from type locality.

*Other material.*—USNM 101469–101485, 17 whole-mounted specimens, including immature and partially mature worms, from type locality.

*Description.*—Length (fixed specimens) 6.1–10.7 mm, 44–65 segments. Diameter at XI (whole-mounted, somewhat compressed worms) 0.32–0.44 mm. Clitellum extending over XI–XII. Setae (Fig. 2B) bifid, with upper tooth thinner than, but about as long as, lower. Bifids 40–60 µm long. 1.5–2.5 µm thick, (1)2–4 per bundle anteriorly, (1)2–3 per bundle in postclitellar segments. Ventral setae absent from XI. Male pores (Fig. 2A, mp) paired in line with ventral setae, posterior to middle of XI. Spermathecal pores (Fig. 2A, sp) paired in line with ventral setae, anteriorly in X.

Pharyngeal glands in III–V. Oesophagus dilated, thick-walled and with reticulate blood-plexus, in whole length of IX. Male ducts and spermathecae small in relation to body size (cf. Fig. 2A). Male genitalia (Fig. 2D) paired. Vas deferens 7–10 µm wide, about as long as atrium, joining apical end

of latter. Atrium slender, tubular, about 165 μm long, with thin but distinct outer lining of muscles. Both ental part of atrial ampulla and ectal duct narrow (10–19 μm wide), with thin inner epithelium; middle part of atrium (ectal part of ampulla) conspicuously wider (about 25 μm), containing cone-shaped prostatic pad. Atrial duct shorter than ampulla, somewhat granulated in its middle part, ectally slightly dilated and opening to exterior through simple pore. Prostate gland small, lobed. Spermathecae (Fig. 2C) very small, with 24–27 μm long, 18–19 μm wide, ducts, and more or less spherical, 20–30 μm wide ampullae; ducts ectally dilated in fully mature specimens. Sperm as a small, curved bundle in each spermathecal ampulla.

*Remarks.*—This is the third species in the genus *Doliodrilus* Erséus, 1984, which accommodates limnodriloidines with (1) modified oesophagus in IX (but without proper anteroventral diverticula in this segment), (2) slender atria with a distinct prostatic pad in most ectal part of each atrial ampulla, (3) simple atrial ducts terminating in simple male pores, although the most ectal part of the ducts may be dilated, sharply bent, or modified into a posteriorly directed blind sac, and (4) a similar dilation of the most ectal part of the spermathecal ducts; cf. definition of genus given by Erséus (1985).

*Doliodrilus puertoricensis* is with regard to the atrial ducts the least modified species of the genus; in *D. tener* Erséus, 1984 (from Hong Kong) there is an abrupt bend about two-thirds down the length of the atrial ducts and in *D. diverticulatus* Erséus, 1985 (from Saudi Arabia) this 'bend' is further elaborated into a blind sac. The new species is further distinguished from the other two by its very small, roundish spermathecal ampullae, and its fewer setae (up to 5 or 6, occasionally even 7, setae per bundle anteriorly in the others), and from *D. diverticulatus* by its lack of an unpaired, dorsal oesophageal diverticulum in segment IX.

*Distribution and habitat.*—Known only from the type locality, west coast of Puerto Rico. Subtidal muds, subject to fluctuating salinities, 1–2.5 m depth. The species co-occurs with *Thalassodrilides gurwitschi* (Hrabě) and *T. belli* (Cook); cf. Erséus (1981).

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